REMARKS

In view of the above amendment, applicant believes the pending application is in condition for allowance.

The Office Action and prior art relied upon have been carefully considered. In an effort to expedite the prosecution.

The outstanding Office Action indicates the withdrawal of claims 1-4 and 6-10. However, as indicated in the Interview Summary dated January 18, 2007, claims 6-10 should be examined as well, notwithstanding applicant's erroneous listing of Species 1 as only readable on claims 11, 13 and 14. In fact Species 1 is also readable on claims 6-10. The Examiner appreciated this point during the interview of January 10, 2007. The present amendment cancels claims 6-10 and presents them as corresponding independent claims 15-19. The previous withdrawal of claims from consideration should be withdrawn and these new claims in addition to amended claims 11-14 should be examined, particularly in view of the allowability of claims 5 and 11 as discussed below.

Claims 5 and 11 were rejected under 35 USC 103(a) as unpatentable over Griebentrog (GB 2 050 679 A) in view of Nathenson (4,842,054). The comments below address this issue.

The Examiner objected to certain phrases in the claims as being functional and directed to intended use. Applicant has presented the amended claims in a manner defining steps and structure combinations that define over the art. Functional language is included only for clarification of the claimed invention.

Applicant believes that claim 5 is not obvious over Griebentrog (GB-2 050 679) in view of Nathenson (US-4,842,054) for the following reasons.

In the secondary circuit of Griebentrog, the second exchange gas undergoes an expansion in the gas turbine 8 by a factor of approximately 9, and then undergoes three successive steps of

cooling and compression (see figure 1 and page 3, lines 40 to 56). The three compressors 14, 16 and 18 are driven by the main shaft of the turbine 8.

In contrast to Griebentrog, the subject-matter of claim 5 has a tertiary steam and water circuit driving at least one steam turbine, in addition to the gas turbine of the secondary circuit.

As a consequence, it is possible to use a gas turbine in the secondary circuit which has a low expansion ratio (70 bars at the inlet, 20 bars or 30 bars at the outlet, see page 10, third and forth paragraphs), and a compressor for the second exchange gas with a low compression ratio. Only a low proportion of the energy supplied to the gas turbine and to the steam turbine is lost for driving the compressor (see page 15, forth paragraph). In this way the problem identified on page 1, last paragraph, and page 2, first and second paragraphs, of the present specification is solved. These paragraphs indicate that, in facilities including several compressors driven by the turbine shaft, a high proportion of the energy recovered by the turbine is dedicated to driving the compressors. Accordingly, the overall yield of the facility is reduced by the same amount. Griebentrog suffers from this draw back.

Nathenson does not teach that it is possible to reduce the energy losses and to increase the overall yield by adding to the nuclear reactor of Griebentrog a tertiary circuit including steam turbines.

It must be emphasized that the facility of Nathenson is completely different from the nuclear reactor of Griebentrog. Nathenson describes a pool type nuclear reactor cooled by a liquid metal (such as sodium), typically a fast breeder reactor (see column 1, lines 7 to 30 and column 5, lines 59 to 62). Thermodynamic cycles in such a reactor are completely different from those of a high temperature reactor in which helium is used as a primary exchange fluid, and in which a mixture of helium and nitrogen are used as secondary fluid. No teaching can be derived from Nathenson regarding the overall energy yield of the thermodynamic cycles of the facility of Griebentrog.

Furthermore, Nathenson teaches nothing regarding how to solve problems related to the use of a turbine with a high expansion ratio in a secondary circuit. First, because the secondary circuit of Nathenson does not have a turbine (see figure 1). Second, because the secondary fluid of Nathenson is liquid sodium and as a consequence it cannot undergo in the secondary circuit an expansion with such a very high ratio. Expansion ratios of 9 can be reached only when the secondary fluid is a gas and certainly not with a liquid.

Further, Nathenson does not describe a water and steam tertiary circuit exchanging heat with a helium/nitrogen secondary circuit. Thus, the shortcomings of Griebentrog relative to the subject matter of claim 5 cannot be reasonably supplied to one of ordinary skill in the art by Nathenson.

Indeed, combining Griebentrog and Nathenson does not lead to the subject-matter of claim 5. Theoretically including, in the nuclear reactor of Griebentrog, the secondary and tertiary circuits of Nathenson leads to suppressing turbine 8 of the secondary circuit of Griebentrog and leads to adding a tertiary circuit with a steam turbine. It does not lead to a nuclear reactor having a secondary circuit with a gas turbine and having a tertiary circuit with a steam turbine.

Regarding the motivation that the man skilled in the art could have to combine Nathenson and Griebentrog, the Examiner states that it is based on the teaching of Nathenson according to which a reduction of the temperature of the primary and secondary fluids leads to an increase in the electrical efficiency.

Assuming arguendo that it is true for a reactor in which the primary and secondary fluids are metal sodium, there is no teaching in Nathenson that it is true as well for a high temperature reactor in which the primary fluid is helium and in which the secondary fluid is a mixture of helium and nitrogen.

Furthermore, nothing in Nathenson suggests that adding a tertiary water and steam circuit in the high temperature nuclear reactor of Griebentrog would lead to a decrease in the operating temperature of the primary and secondary fluids.

The statement that the electrical efficiency increases when the temperature of the primary and secondary fluids decreases seems actually true in the case where one uses a electromagnetic pump coupled to a heat exchanger in the primary circuit, as indicated in Nathenson, column 2, lines 62 to 66. This section of Nathenson indicates that it is actually the electrical efficiency of the flow coupler (electromagnetic pump + heat exchanger) which increases when the temperature decreases. Such a flow coupler is not used in Griebentrog, since an electromagnetic pump can be used only when the fluids to be pumped are metals, which is not the case in Griebentrog. Thus, the teaching that the electrical efficiency can be increased when the temperature of the fluids are decreased seems to be true only in nuclear reactors equipped with flow couplers. Since the nuclear reactor of Griebentrog does not have such a flow coupler, said teaching cannot constitute a motivation to include features of Nathenson into Griebentrog.

In view of the above, consideration and allowance are, therefore, respectfully solicited.

In the event the Examiner believes an interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number noted below.

The Director is hereby authorized to charge any fees, or credit any overpayment, associated with this communication, including any extension fees, to CBLH Deposit Account No. 22-0185, under Order No. 20513-00607-US from which the undersigned is authorized to draw.

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Respectfully submitted,

By_______/Morris Liss/______________

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